ing the base of the root sheath, and the basal thickening of the papillæ. The superficial layer consists of ascending longitudinal fibres, which cover the preceding. The fine axis cylinders which come from these two series of fibres traverse the vitreous membrane, and form thick plaques about the tactile cells of Merkel. These plaques are somewhat meniscus shaped; they are not the true nerve terminations, however; these are found as very minute and delicate axis cylinder prolongations, which end between the cells. VOGEL.

81. OBSERVATIONS ON SENSORY NERVE-ENDINGS IN VOLUNTARY MUSCLES. A. Ruffini (Brain, 20, 1897, p. 368).

A series of notes is here presented dealing with muscle spindles, tendon organs and Pacinian corpuscles found in muscles. The general conclusions to be derived from the author's paper are:

1. There are in the voluntary muscles nerve fibres of three kinds—motor, sensory and vaso-motor.
2. The motor nerve fibres end, as is well known, in the *end plates* of Rouget and Kühne.
3. The sensorial nerve fibres possess three quite distinct end organs in man and in all the higher vertebrata. These sensorial end organs of muscle are: (a) The muscle spindles, (b) the tendon organs (or Golgi organs) and (c) Pacinian corpuscles.
4. The vaso-motorial nerve fibres form reticular plexuses or true terminal plates (Mazzoni), or terminate simply on the capillary walls with a fine apical enlargement (Ruffini).
5. The functions of the motor plates and vaso-motorial endings has been known for years. Further, physiological experimentation is now wanted to investigate the functional activities of the three sensorial organs, the spindles, the tendon organs, and the Pacinian corpuscles. In the author's opinion it is to these three kinds of sense organs that physiology must turn its attention if it will resolve the problem of the muscular sense. JELLIFFE.

PATHOLOGY.

82. THE MUSCLE SPINDLE UNDER PATHOLOGICAL CONDITIONS. Fred E. Batten (Brain, 20, 1897, p. 138).

The author treats of the following subjects in this paper: The history of the researches made upon the muscle spindle, the various views held with regard to its origin and function, the technical methods employed in the research, the histology of the spindle as found in man, and its modifications in the following diseases: Infantile paralysis, tabes, myopathy, progressive muscular atrophy, peripheral neuritis, trauma of brachial plexus and following sciatic nerve section.

In these various diseases, *seriatim*, the author states:

In infantile paralysis it would seem probable that the muscle spindle remains absolutely intact, both in regard to the intra-fusal muscle fibres and in regard to the contained nerves.

In tabes, in two cases of three examined, the spindles were normal; in a third there was a mild grade of degeneration.

In myopathy (Leyden form) the spindles seemed increased in number, but there were no traces of degeneration, or other change.

In progressive muscular atrophy the author's observations are in accord with those of other writers who find no changes in the muscle spindle.

In peripheral neuritis, in one case only examined, there were no changes in the muscle spindles.

In injury to the brachial plexus, with loss of motion and sensation of a year's standing there was an atrophy of the muscle spindle.

In experimental sciatic sections in cats atrophy of the spindles was found.

The paper is richly illustrated and a careful bibliography is appended. JELLIFFE.

83. LE PHÉNOMÈNE DE CHROMATOLYSE, CONSECUTIF A LA LESION PATHOLOGIQUE OU EXPERIMENTALE DE L'AXONE (The Phenomena of Chromatolysis, etc.) M. Van Gehuchten (Bulletin de l'Academie Royale de Medicine de Belgique 11, 1897, p. 805).

The phenomena of chromatolysis, or the changes taking place in the ganglion cells following pathological or experimental lesions of the axon, disappearance of the chromophilic granules, swelling of the cell body, displacement of the nucleus, etc., have occupied such a prominent place in the pathological field within the past few years, that the conclusions of Van Gehuchten upon these changes are of especial interest. These are as follows:

1. All pathological and experimental lesions of the axis cylinder of a motor neuron result in the process of chromatolysis in the originating cell body of this neuron, the duration and intensity of which being in direct proportion to the duration and intensity of the lesion.
2. Lesion of a peripheral nerve is not the only cause capable of producing chromatolysis. Such a phenomenon can follow in a variety of conditions, which fact must be borne in mind in the explanation of clinical conditions.
3. The section of the cellulipetal prolongation of a peripheral sensory neuron also results in chromatolysis of the cell of origin. This chromatolysis is more marked than that which is seen in a motor neuron. It is followed by the disorganization and disappearance of the corresponding cell.
4. The disappearance of the cells of the spinal ganglia, following section of their peripheral prolongations, is due not only to the lesion of these prolongations, but, of more import, it is due to the lack of trophic action which stimulation from without produces upon these nerve cells.
5. The ganglion cells in a nervous chain exercise the one upon the other a trophic action, the suspension of which produces a chromatolysis and disappearance of the corresponding cells.
6. The section or the lesion of a cellulifugal prolongation of the cells of the cerebro-spinal ganglia is not followed by profound chromatolysis, contrary to what is seen for the motor cells. In the present state of our knowledge this fact remains inexplicable. JELLIFFE.

84. THE EFFECT OF INANITION ON THE STRUCTURE OF NERVE CELLS. F. W. Barrows (Am. Journal of Physiology 1, 1898, p. 14, Proceedings, part 2).

The author studied the cells of the occipital cortex, spinal ganglia and cord in rats, comparing the cells of those which were well nourished with those that had been starved to death. Observations of the movements of the animals were also taken so as to compare the fatigue effects. The study shows:

(1) A decided shrinkage in the size of the cells and nuclei in the famished animals, averaging about 20 per cent., and a still greater shrinkage in the nucleoli.

(2) An evident exhaustion of the substance of famished cells, as shown by their faint staining with osmic acid and the notable absence of nuclei and nucleoli. The protoplasm of these cells shows a very fine vacuolation, not so marked as that described by Rosenbach for starving animals, and by Hodge for extreme fatigue. In the brains of famished rats the pericellular lymph spaces are considerably enlarged. VOGEL.